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IN THE UNITED STATES PATENT & TRADEMARK OFFICE

IN RE APPLICATION OF	:
EDWIN NUN , ET AL.	: EXAMINER: W. P. WATKINS III
SERIAL NO: 10/506,994	:
FILED: JUNE 6, 2005	: GROUP ART UNIT: 1794
FOR: SHEET EXTRUDATES WITH SELF-CLEANING PROPERTIES AND PROCESS FOR PRODUCING THESE EXTRUDATES	:

APPEAL BRIEF

COMMISSIONER FOR PATENTS
ALEXANDRIA, VIRGINIA 22313

SIR:

This is an appeal from the Second Rejection dated March 27, 2009. A Notice of Appeal was timely filed on April 1, 2009.

I. REAL PARTY IN INTEREST

The real party in interest in this appeal is Degussa AG, having an address of Bennigsenplatz 1, D-40474 Düsseldorf, Germany.

II. RELATED APPEALS AND INTERFERENCES

Appellants, Appellants' legal representative and the assignee are aware of no appeals, interferences, or judicial proceedings which may be related to, directly affect or be directly affected by or have a bearing on the Board's decision in this appeal.

III. STATUS OF THE CLAIMS

Claims 21-40 stand rejected and are herein appealed. Claims 1-20 are canceled.

Claims 21-40 also stand rejected on the grounds of nonstatutory obviousness-type double patenting over U.S. 6,811,856 and stand provisionally rejected on the grounds of nonstatutory obviousness-type double patenting over copending Applications 10/506,993, 10/506,238, 10/506,236, 10/519,951 and 10/506,604. Appellants request these rejections be held in abeyance pending the Board's decision on this Appeal.

IV. STATUS OF THE AMENDMENTS

An amendment under 37 CFR 1.116 was filed, March 13, 2009. Under the Advisory Action dated March 27, 2009, the amendment was not entered to the record.

V. SUMMARY OF THE CLAIMED SUBJECT MATTER

It is preliminarily noted that references in brackets are to page and line number of the specification as filed.

Independent Claim 21 is directed to a sheet extrudate comprising at least one surface having self-cleaning properties. A self-cleaning surface is described as one having a suitable combination of hydrophobic property and surface roughness [page 1, lines 7-14]. Claim 21 describes a self-cleaning surface prepared by embedding microparticles in the form of agglomerates or aggregates of 0.2 to 100 μm [page 12, lines 1-2] into a polymer extrudate

sheet [page 4, lines 28-32] to form elevations having an average height of from 20 nm to 25 μm and an average separation of from 20 nm to 25μm [page 5, lines 1-3]. The particles are not secured to the sheet surface by a carrier material [page 3, lines 32-35]. More than 50% of the particles are impressed into the surface a depth of 10-90% of their average particle diameter [page 6, lines 15-20]. The particles are hydrophobicized subsequent to anchoring in the extrudate surface [page 12, line 38].

Dependent Claims 22-29 stand of fall with Claim 21.

Independent Claim 40 is directed to a sheet extrudate including description of Claim 21 and reciting that only the portion of the surface of the microparticles not embedded in the sheet extrudate are hydrophobicized. Hydrophobicization is accomplished by reaction with agents such as alkylsilanes, fluoroalkylsilanes and disilazanes after the particles are applied to the surface of the sheet extrudate. Since the particles are impressed into the polymer surface and not exposed, the nonexposed portions are not available for chemical reaction.

Independent Claim 30 is directed to a process for producing a sheet extrudate having the properties described in Claim 21 [page 9, lines 10-28]. The process includes: 1) impressing microparticles into at least one surface of a melt of a polymer extruded sheet to securely anchor at least one layer of microparticles into the at least one surface, and 2) hydrophobicizing the microparticles securely anchored into the at least one surface of the extruded sheet to form the sheet extrudate comprising at least one surface that has self-cleaning properties.

Dependent Claims 31-39 stand or fall with Claim 30.

There is no means plus function or step plus function description under 35 U.S.C. 112, sixth paragraph in the claims of this application.

VI. THE REJECTION TO BE REVIEWED ON APPEAL

Claims 21-40 stand rejected as unpatentable under 35 U.S.C. § 103(a) for obviousness over Keller et al.(U.S.2002/0016433) in view of Benoit (U.S. 4,963,388) and further in view of Baumann et al. (U.S. 6,800,354).

VII. ARGUMENT

Rejection under 35 U.S.C. § 103(a) over U.S.2002/0016433 in view of U.S. 4,963,388 and further in view of U.S. 6,800,354.

Claims 21-29

Independent Claim 21 requires microparticle agglomerates which are securely anchored to an extruded polymer sheet and subsequently hydrophobizicized on the exposed surface of the microparticle agglomerate. The exposed particle agglomerates form elevations having an average height of from 20 nm to 25 μm and an average separation of from 20 nm to 25μm.

The primary reference cited against Claims 21-29, Keller, describes a coating composition containing 1) at least one powder having particles with a hydrophobic surface and porous structure; and 2) at least one film-forming binder (Abstract). Keller describes a film-forming binder in [0024] as"

> polymers and low molecular mass substances which form a solid film on a surface. The binders serve, for example, to fix the powder particles on the surface of the substrate to be coated or to fix the powder surfaces to one another when the compositions are used as powders or to produce a shaped article.

The primary reference describes the powder as having a porous structure and a hydrophobic surface [0054]. The coating composition may be a powder formulation of the binder and porous particles [0063] or a fluid form which may include a solvent [0065]. The coating compositions are applied to the substrate via liquid coating, [0064-0065, 0071], aerosol coating [0068] and powder coating methods [0073]. Apellants respectfully submit that in each of these application technologies, a homogeneous mixture of powder and binder is applied to the substrate surface to form a homogeneous coating of powder in the binder.

The Office erroneously alleges that Keller (Official Action dated December 1, 2008, page 2, lines 12-14):

> . . . teaches the use of nano-meter size exposed particle agglomerates that form a hydrophobic surface when bound by a polymer binder that is coated with the particles on the surface.

Keller does not describe exposed particles nor does the reference describe or suggest that the particles are on the surface. As indicated above, Keller describes application of homogeneous mixtures which when applied would provide a homogeneous coating, not a surface with particles exposed or with particles on the surface as the Office alleges.

Benoit is cited to show teaching of forming a polymer layer first, then pressing particles into the polymer layer (Official Action dated December 1, 2008, page 2, lines 14-15). In the Advisory Action dated March 27, 2009, the Examiner has stated (page 2, lines 15-18):

> The Examiner relies on the Benoit reference to teach embedding particles. The motivation to do so is to avoid the use of a binder and also simply as a selection of alternate way to join particles to a plastic surface from a small group of known methods.

The Examiner appears to allege that one of ordinary skill in the art at the time of the invention would have been motivated to apply the embedding method of Benoit which is directed to a thermoplastic film (Col. 5, lines 50-54) to the coating application of Keller

which is directed to all conventional surfaces [0070] including wood, metal and glass. Appellants submit that removal of the binder from the coating composition of Keller would at least change the principal of operation of the primary reference (*In re Ratti*, 270 F.2d 810, 123 USPQ 349 (CCPA 1959)) and for non-thermoplastic substrates such as wood, metal and concrete would render the Keller composition unsatisfactory for application of a fixed coating (*In re Gordon*, 733 F.2d 900, 221 USPQ 1125 (Fed. Cir. 1984).

The Office has cited Baumann as follows (Official Action dated December 1, 2008, page 2, lines 13-16):

> Baumann et al. teaches **coating** a structured surface formed of bound particles, which are not highly hydrophobic, after the structured surface formation with a hydrophobic silane type **coating** in order to better repel water from the surface (col. 7, lines 10-45). (Bold added)

Baumann describes a substrate with a coating containing particles fixed to the substrate by a binder (Abstract). The binder coating can be a homogeneous layer over the structure forming particles and the particles may project at least partially out of the surface. The **surface** is hydrophobitized to form a hydrophobic coating (Col. 3, lines 48-61).

According to Baumann the binder surface coating is a vitreous material such as glass frit which is fired to melt and in the melt phase flows to enclose the particles. When cooled a hardened glass surface is formed (Col. 4, lines 4-33). A **hydrophobic layer** is then formed on the structured substrate surface (Col. 4, lines 64-67). In the formation of the hydrophobic coating (Col. 5, lines 27-28) using an organosilane, silanol groups of the coating material chemically react to form Si-O-Si bonds (Col. 5, lines 39-41; Col. 7, lines 19-23). In describing the "coating or layer forming material" (Col. 7, lines 10-11), Baumann states:

> Preferably, however, the entire surface is hydrophobized. The hydrophobization includes the application of a very thin coating, which adheres firmly to the underlying surface.

Appellants previously argued (Reply to Office Action of December 1, 2009, filed March 13, 2009, not entered to the record) as follows:

In contrast, the claimed invention describes only hydrophobization of the exposed surface of the anchored microparticles (Claim 22). Applicants respectfully submit that nowhere does Baumann disclose, suggest or provide motivation that would have led one of ordinary skill in the art, at the time of the invention, to hydrophobizing only the exposed surface of the particles, as according to the claimed invention.

The Office has cited Bauman (Advisory Action dated March 27, 2009, page 2, lines 22-23) as teaching "that only the peaks caused by the particles may be coated . . ." Appellants respectfully submit that this description does not teach only the particles are treated as the Office alleges. Bauman describes that the coating can be a homogeneous layer over the particles (Col. 3, lines 50-55) and Appellants note that such structure would also form elevations or peaks to be treated with the hydrophobizing agent.

Moreover, the Examiner has stated (Advisory Action dated March 27, 2009, page 2, lines 18-20):

> Regarding the argument of only the particles being made hydrophobic, the instant claims are not limited to only the particles being made hydrophobic.

Appellants respectfully disagree as Claim 21 clearly states:

> 2) hydrophobicizing the microparticles securely anchored into the at least one surface.

In addition, Claims 22 and 23 recite treating the microparticles for hydrophobicizing.

The Examiner has alleged that (Advisory Action dated March 27, 2009, page 2, lines 18-20):

> Nothing in the instant claims prevents the substrate from being treated to become hydrophobic.

Appellants disagree and refer to Bauman's description above which infers that the silanizing agents react with –OH groups of the coating to form the hydrophobic layer. However, as indicated in Claim 25, the sheet extrudate of the claimed invention does not comprise materials which contain functional groups reactive to alkylsilanes, fluoralkylsilanes or disilazanes and therefore only the microparticles can react.

Applicants respectfully repeat the Office's own discussion of **"Examination Guidelines for Determining Obviousness Under 35 U.S.C. 103 in View of the Supreme Court Decision in *KSR International Co. v. Teleflex Inc.*"**

> "The rationale to support a conclusion that the claim would have been obvious is that **all the claimed elements were known in the prior art** and one skilled in the art could have combined the elements as claimed by known methods with no change in their respective functions, and the combination would have yielded nothing more than predictable results to one of ordinary skill in the art at the time of the invention.[43] ""[I]t can be important to identify a reason that would have prompted a person of ordinary skill in the relevant field to combine the elements in the way the claimed new invention does."[44] **If any of these findings cannot be made, then this rationale cannot be used to support a conclusion that the claim would have been obvious to one of ordinary skill in the art,**" (Federal Register, Vol. 72, No. 195, page 57529) **(Bold added)**

In view of the above, Applicants respectfully submit that not all the elements claimed in the present invention are described in the combined descriptions of the cited references. Baumann only describes a hydrophobic thin layer applied to the entire coated substrate surface and not only the exposed surfaces of the microparticles.

Moreover, both Keller and Baumann describe binder coatings. In contrast, the claimed invention provides a surface which is free of a carrier or binder.

In a Precedential Opinion rendered by the Board of Patent Appeals and Interferences in *Ex parte* Whalen II (Appeal 2007-4423, Application 10/281,142) on July 23, 2008, the Board stated:

> "The KSR Court noted that obviousness cannot be proven merely by showing that the elements of a claimed device were known in the prior

> art; it must be shown that those of ordinary skill in the art would have had some "apparent reason to combine the known elements in the fashion claimed.""
>
> "The Examiner has not persuasively explained why a person of ordinary skill in the art would have had a reason to modify the compositions taught by Evans, Greff'767, or Taki in a way that would result in the compositions defined by the claims on appeal. Therefore, The Examiner has not made out a prima facie case of obviousness under 35 U.S.C. § 103."

Applicants respectfully submit that the Office has not explained why or how one of ordinary skill in the art, at the time of the invention, would have combined the three cited references to obtain the claimed invention. Two of the cited references, Keller and Baumann, require a binder and are directed to coatings applied to a solid substrate surface. Benoit is directed to a thermoplastic stretch wrap film coated on one side with an antiblock agent. The technology of Keller and Bauman does not pertain to the same field of endeavor as that of Benoit. The different technologies do not address the same problem and are nonanalogous art.

Moreover, none of the references hydrophobitize only the exposed particle surface.

In view of all the above, the Office has not met its burden to show a prima facie case of obviousness and the rejection of Claims 21-29 under 35 U.S.C. § 103(a) as being unpatentable in view of Keller et al.(U.S.2002/0016433) in view of Benoit (U.S. 4,963,388) and further in view of Baumann et al. (U.S. 6,800,354) should be reversed.

Claim 40

Claim 40, in addition to description from Claim 21, specifically recites that only the portion of the surface of the microparticles not embedded in the sheet extrudate are hydrophobicized. Appellants have described above that none of the references disclose or suggest that only the exposed portion of the microparticle be hydrophobicized. As described

above, Baumann describes reaction of surface –OH groups with hydrophobizing agents (Col. 5, lines 32-42) and the peaks of the structure may be this surface. Benoit does not disclose or suggest treatment with a hydrophobizing agent and actually describes that the surface particles may be hydrophobic or hydrophilic (Col. 5, lines 50-63). Keller describes hydrophobic particles in the coating composition and therefore upon application of the coating, all the particle is hydrophobic, not just the exposed surface.

As the references individually or in combination do not disclose or suggest that only the portion of the surface of the microparticles not embedded in the sheet extrudate are hydrophobicized as according to the present invention, the Office has not met its burden to show a prima facie case of obviousness. Accordingly the rejection of Claim 40 under 35 U.S.C. § 103(a) as being unpatentable in view of Keller et al.(U.S.2002/0016433) in view of Benoit (U.S. 4,963,388) and further in view of Baumann et al. (U.S. 6,800,354) should be reversed.

Claims 30-39

Claim 30 describes a process comprising 1) impressing microparticles into at least one surface of a melt of a polymer extruded sheet to securely anchor at least one layer of microparticles into the at least one surface, and 2) hydrophobicizing the microparticles securely anchored into the at least one surface of the extruded sheet to form the sheet extrudate comprising at least one surface that has self-cleaning properties.

As previously discussed, Keller describes application of a homogeneous coating composition to a substrate surface and provides no description of either 1) impressing or 2) hydrophobicizing. Baumann describes application of a composition which is fired to form the fixed coating and then hydrophobicizing the surface so formed (see previous discussion and citations regarding this reference). Benoit is directed to an unrelated technology where

particles are applied to a thermoplastic film. The particles may be hydrophobic or hydrophilic and no after treatment of hydrophobicizing is described or suggested. Therefore, the Office has not met its burden to show a prima facie case of obviousness and the rejection of Claims 30-39 under 35 U.S.C. § 103(a) as being unpatentable in view of Keller et al.(U.S.2002/0016433) in view of Benoit (U.S. 4,963,388) and further in view of Baumann et al. (U.S. 6,800,354) should be reversed.

CONCLUSION

For the above reasons, it is respectfully requested that the outstanding rejection of the pending claims be reversed.

Respectfully submitted,

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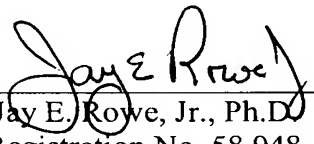

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VIII. CLAIMS APPENDIX

Claims 1-20 (Cancelled):

Claim 21 (Rejected): A sheet extrudate comprising at least one surface that has self-cleaning properties, made by a process comprising

1) impressing microparticles into at least one surface of a melt of a polymer extruded sheet to securely anchor at least one layer of the microparticles into the at least one surface, and

2) hydrophobicizing the microparticles securely anchored into the at least one surface of the extruded sheet to form the sheet extrudate comprising at least one surface that has self-cleaning properties,

wherein the microparticles in 1) comprise microparticles that do not have hydrophobic properties before the hydrophobicizing is conducted,

wherein the microparticles have, from primary particles, combined to give agglomerates or aggregates whose size is from 0.2 μm to 100 μm, that form elevations having an average height of from 20 nm to 25 μm and an average separation of from 20 nm to 25μm,

wherein the microparticles have been directly anchored in the within the at least one surface of the extruded sheet by the impressing and have not been linked via a carrier material,

wherein more than 50% of the microparticles, after impressing, have been anchored with from 10% to 90% of their average particle diameter within the at least one surface, and

wherein the more than 50% of the microparticles that after impressing have been anchored with from 10% to 90% of their average diameter within the at least one surface

comprise microparticles that do not have hydrophobic properties before the hydrophobicizing is conducted.

Claim 22 (Rejected): The sheet extrudate of claim 21, wherein the hydrophobcizing comprises treating the microparticles with alkylsilanes, fluoroalkylsilanes, disilazanes, or combinations thereof.

Claim 23 (Rejected): The sheet extrudate of claim 22, wherein the microparticles are treated with perfluoroalkylsilanes.

Claim 24 (Rejected): The sheet extrudate of claim 21, wherein the elevations have an average height of from 50 nm to 4 μm and/or an average separation of from 50 nm to 4 μm.

Claim 25 (Rejected): The sheet extrudate of claim 21, wherein the extruded sheet of the sheet extrudate comprises a material selected from polycarbonates, polyoxymethylenes, polyacrylates, polymethacrylates, polyamides, polyvinyl chloride, polyethylenes, polypropylenes, aliphatic linear polyalkenes, branched polyalkenes, cyclic polyalkenes, polystyrenes, polyesters, polyacrylonitrile, polyalkylene terephthalates, and polyvinylidene fluoride, or comprises other polymers from polyisobutene, poly-4-methyl-l-pentene, and polynorbornene, in the form of homo- or copolymer, or else comprises a mixture of these.

Claim 26 (Rejected): The sheet extrudate of claim 21, wherein the extruded sheet comprises at least one material selected from the group consisting of poly(ethylene), poly(propylene), polycarbonate, polyesters, and poly(vinylidene fluoride).

Claim 27 (Rejected): The sheet extrudate of claim 21, wherein the microparticles have been anchored with from 20% to 50% of their average particle diameter within the at least one surface.

Claim 28 (Rejected): The sheet extrudate of claim 21, wherein the microparticles comprise at least one selected from the group consisting of silicates, doped silicates, minerals, metal oxides, metal powders, silicas, pigments, and polymers, with the proviso that at least some of the microparticles comprise microparticles that do not have hydrophobic properties before the hydrophobicizing is conducted.

Claim 29 (Rejected): The sheet extrudate of claim 21, wherein the impressing is conducted with a roller.

Claim 30 (Rejected): A process for producing a sheet extrudate, the process comprising

1) impressing microparticles into at least one surface of a melt of a polymer extruded sheet to securely anchor at least one layer of microparticles into the at least one surface, and

2) hydrophobicizing the microparticles securely anchored into the at least one surface of the extruded sheet to form the sheet extrudate comprising at least one surface that has self-cleaning properties,

wherein the microparticles in 1) comprise microparticles that do not have hydrophobic properties before the hydrophobicizing is conducted,

wherein the microparticles have, from primary particles, combined to give agglomerates or aggregates whose size is from 0.2 μm to 100 μm, that form elevations having an average height of from 20 nm to 25 μm and an average separation of from 20 nm to 25μm,

wherein the microparticles have been directly anchored in the within the at least one surface of the extruded sheet by the impressing and have not been linked via a carrier material.

Claim 31 (Rejected): The process of claim 30, wherein more than 50% of the microparticles in 1) are impressed only to the extent of 90% of their diameter into the at least one surface of the polymer extruded sheet.

Claim 32 (Rejected): The process of claim 31, wherein the impressing is conducted by means of a roll.

Claim 33 (Rejected): The process of claim 32, wherein prior to the impressing, the microparticles are applied to the surface of the roll.

Claim 34 (Rejected): The process of claim 33, wherein prior to the impressing, the microparticles are sprayed onto the roll.

Claim 35 (Rejected): The process of claim 30, comprising at least two rolls, wherein the microparticles are impressed into two surfaces of the polymer extruded sheet on two sides of the polymer extruded sheet.

Claim 36 (Rejected): The process of claim 30, wherein the extruded sheet of the sheet extrudate comprises a material selected from polycarbonates, polyoxymethylenes, polyacrylates, polymethacrylates, polyamides, polyvinyl chloride, polyethylenes,

polypropylenes, aliphatic linear polyalkenes, branched polyalkenes, cyclic polyalkenes, polystyrenes, polyesters, polyacrylonitrile, polyalkylene terephthalates, and polyvinylidene fluoride, or comprises other polymers from polyisobutene, poly-4-methyl-l-pentene, and polynorbornene, in the form of homo- or copolymer, or else comprises a mixture of these.

Claim 37 (Rejected): The process of claim 30, wherein the extruded sheet comprises at least one material selected from the group consisting of poly(ethylene), poly(propylene), polycarbonate, polyesters, and poly(vinylidene fluoride).

Claim 38 (Rejected): The process of claim 30, wherein the hydrophobcizing comprises treating the microparticles with alkylsilanes, fluoroalkylsilanes, disilazanes, or combinations thereof.

Claim 39 (Rejected): The process of claim 30, wherein wherein the microparticles comprise at least one selected from the group consisting of silicates, doped silicates, minerals, metal oxides, metal powders, silicas, pigments, and polymers, with the proviso that at least some of the microparticles, so long as the microparticles comprise microparticles that do not have hydrophobic properties before the hydrophobicizing is conducted.

Claim 40 (Rejected): A sheet extrudate, comprising an extruded sheet and microparticles directly anchored within at least one surface of the extruded sheet,

wherein the microparticles have, from primary particles, combined to give agglomerates or aggregates whose size is from 0.2 μm to 100 μm, that form elevations having an average height of from 20 nm to 25 μm and an average separation of from 20 nm to 25μm,

wherein more than 50% of the microparticles, after impressing, have been anchored with from 10% to 90% of their average particle diameter within the at least one surface, and wherein the embedded microparticles comprises microparticles where only the portion of the surface of the microparticles not embedded in the sheet extrudate are hydrophobicized.

IX. EVIDENCE APPENDIX

None

X. RELATED PROCEEDINGS APPENDIX

None